

CLAIMS:

--1. A touch-free faucet adapter apparatus for retrofitting a sink with a conventional touch-activated faucet, comprising:

a sensor unit; and

a controller unit, wherein said sensor unit is attached to said sink to detect the proximity of a user's hands and when said hands are detected said sensor unit sends a signal to said controller unit to activate the flow of water through the faucet.

--2. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said sink with a conventional touch-activated faucet contains a faucet that is a gooseneck style faucet,

and said sensor unit is mechanically attached to the faucet by passing the sensor unit over a spout end of the faucet and towards a base of the faucet where it is locked in place by a clamping part.

--3. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said sink with a conventional touch-activated faucet contains a faucet that is not a gooseneck style faucet,

and said sensor unit is mounted directly on top of said sink near the said faucet.

--4. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said sensor unit comprises:

a first infrared (IR) LED that is oriented to point up relative to the horizontal;

a second IR LED that is oriented to point down relative to the horizontal; and
a photo detector element, wherein

a wide vertical range of detection results spanning from below the said sensor unit up to an upper limit located below a spout of said faucet, thereby preventing activation by a hand placed too close to said spout while allowing for a wide range of detection and preventing specular reflection from an edge of said sink.

--5. The touch-free faucet adapter apparatus as set forth in claim 4, wherein said sensor unit comprises:

a transmitter window located in front of said first and second IR LEDs that is transparent to IR light but is opaque to ambient light;

a receiver window located in front of said photo detector element that is transparent to IR light but is opaque to ambient light;

an internal barrier for preventing the transmission of light directly from the said first and second IR LEDs to the said photo detector element; and

a sensor unit housing molded with one or more slightly protruding barriers or ridges that serve to separate said transmitter window from said receiver window for preventing splashed water droplets from forming a light conducting bridge from said first or second IR LEDs to said photo detector element.

--6. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said controller unit comprises:

a first latching solenoid valve for activating and deactivating a hot water source;

a second latching solenoid valve for activating and deactivating a cold water source;

a first manual valve for adjusting a flux of hot water; and

a second manual valve for adjusting a flux of cold water, wherein the said first and second manual valves are used to initially set a desired mix of hot and cold water and the said first and second latching solenoid valves are used to activate and deactivate the flow of said water;

wherein a controller circuit automatically pulses said faucet to an off state upon power failure and said controller unit further includes a short term power storage capacitor to provide power for the shutoff; and

wherein said controller circuit additionally provides a 1.5 second delay and sensor hysteresis to prevent the water from pulsing on and off in response to the movement of hands in and out of a range of detection of said sensor unit.

--7. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said sensor unit comprises a temperature sensing element mounted in contact with said faucet, and

said controller unit comprises:

a first servo-type valve for adjusting a flux of a hot water source;

a second servo-type valve for adjusting a flux of a cold water source;

a latching solenoid valve for activating and deactivating a flow of water through the faucet;

a controller circuit, wherein said controller circuit receives a temperature sensing signal from said temperature sensing element and uses said signal to control said first and second servo-type valves to archive desired water temperature;

wherein said controller circuit additionally automatically pulses the said faucet to an off state upon power failure and said controller unit further includes a short term power storage capacitor to provide power for the shutoff; and

wherein said controller circuit additionally provides a 1.5 second delay and sensor hysteresis to prevent the water from pulsing on and off in response to the movement of hands in and out of a range of detection of said sensor unit.

--8. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said control unit comprises a microprocessor to provide a cumulative measurement of the total time said faucet has been activated and an approximate volume of water dispensed.

--9. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said control unit comprises a microprocessor to provide a pre-programming of initial settings.

--10. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said control unit comprises a microprocessor to provide an automatic test sequence for field servicing.

--11. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said control unit comprises a microprocessor to provide functions to monitor and adjust the temperature of water emerging from said faucet.

--12. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said control unit comprises a microprocessor to provide functions to limit the time said faucet may remain activated.

--13. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said control unit comprises a microprocessor to provide functions to permit inhibiting the controller unit from activating the flow of water through the faucet when an inhibit command has been input.

--14. The touch-free faucet adapter apparatus as set forth in claim 1, wherein said control unit comprises a microprocessor to provide functions to display a signal indicating that the flow of water through the faucet has been activated when the flow of water through the faucet has been activated.